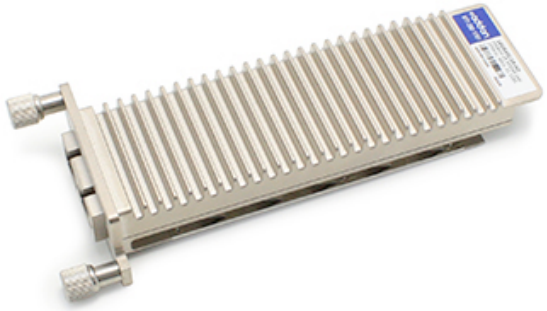
10GBASE-ER-AO

10Gbs XENPAK Transceiver



Features

- Compatible with XENPAK MSA
- Support of IEEE 802.3ae 10GBASE-LR at 10.3125Gbps
- ≤40km ER (Extended Range) 10GBE
- Cooled EA-DFB/PIN-PD
- SC Duplex Receptacle Package
- Hot Pluggable 70-PIN Connector
- XAUI Electrical Interface 4 x 3.125 Gb/s Ethernet
- Management and control via MDIO 2-wire interface
- Power supply: +5.0 V, +3.3 V, APS: +1.2 V
- Diagnostic Optics Monitoring
- Temperature Range: 0~ 70 °C
- ROHS6 Compatible and lead free

Applications

- 10Gb/s Ethernet Transmission Systems

Product Description

AddOn Computer's 10GBASE-ER-AO transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The SFP+ transceivers are high performance, cost effective modules supporting dual data-rate of 10Gbps and support distance up to 10km with SMF.

AddOn Computer's XENPAK transceivers are RoHS compliant and lead-free

Pin Descriptions

Pin	Symbol	Name/Descriptions	Ref.
1	GND	Electrical Ground.	1
2	GND	Electrical Ground.	1
3	GND	Electrical Ground.	1
4	5.0V	Power	2
5	3.3V	Power	2
6	3.3V	Power	2
7	APS =1.2V	Adaptive Power Supply.	2
8	APS =1.2V	Adaptive Power Supply.	2
9	LASI	Open Drain Compatible 10K-22K pull up on host. Logic High: Normal Operation Logic Low: LASI Asserted	3
10	RESET	Open Drain compatible. 10-22K pull-up on transceiver Logic high = Normal operation Logic low = Reset Minimum reset assert time 1 ms	3
11	VEND SPECIFIC	Vendor Specific Pin. Leave unconnected when not in use.	6
12	TX ON/OFF	Open Drain compatible. 10-22K pull-up on transceiver Logic high = Transmitter On (capable) Logic low = Transmitter Off (always)	3
13	RESERVED	Reserved	
14	MODE DETECT	Pulled low inside module through 1k	3
15	VEND SPECIFIC	Vendor Specific Pin. Leave unconnected when not in use.	6
16	VEND SPECIFIC	Vendor Specific Pin. Leave unconnected when not in use.	6
17	MDIO	Management Data IO	3,4
18	MDC	Management Data Clock	3,4
19	PRTAD4	Port Address Bit 4 (Low = 0)	3
20	PRTAD3	Port Address Bit 3 (Low = 0)	3
21	PRTAD2	Port Address Bit 2 (Low = 0)	3
22	PRTAD1	Port Address Bit 1 (Low = 0)	3
23	PRTAD0	Port Address Bit 0 (Low = 0)	3
24	VEND SPECIFIC	Vendor Specific Pin. Leave unconnected when not in use.	6
25	APS SET	Feedback input for APS	

26	RESERVED	Reserved for Avalanche Photodiode use.	6
27	APS SENSE	APS Sense Connection	
28	APS =1.2V	Adaptive Power Supply	2
29	APS =1.2V	Adaptive Power Supply	2
30	3.3V	Power	2
31	3.3V	Power	2
32	5.0V	Power	2
33	GND	Electrical Ground	1
34	GND	Electrical Ground	1
35	GND	Electrical Ground	1
36	GND	Electrical Ground	1
37	GND	Electrical Ground	1
38	RESERVED	Reserved	
39	RESERVED	Reserved	
40	GND	Electrical Ground	1
41	RX LANE0+	Module XAUI Output Lane 0+	5
42	RX LANE0-	Module XAUI Output Lane 0-	5
43	GND	Electrical Ground	1
44	RX LANE1+	Module XAUI Output Lane 1+	5
45	RX LANE1-	Module XAUI Output Lane 1-	5
46	GND	Electrical Ground	1
47	RX LANE2+	Module XAUI Output Lane 2+	5
48	RX LANE2-	Module XAUI Output Lane 2-	5
49	GND	Electrical Ground	1
50	RX LANE3+	Module XAUI Output Lane 3+	5
51	RX LANE3-	Module XAUI Output Lane 3-	5
52	GND	Electrical Ground	1
53	GND	Electrical Ground	1
54	GND	Electrical Ground	1
55	TX LANE0+	Module XAUI Input Lane 0+	5
56	TX LANE0-	Module XAUI Input Lane 0-	5
57	GND	Electrical Ground	1
58	TX LANE1+	Module XAUI Input Lane 1+	5
59	TX LANE1-	Module XAUI Input Lane 1-	5
60	GND	Electrical Ground	1

61	TX LANE2+	Module XAUI Input Lane 2+	5
62	TX LANE2-	Module XAUI Input Lane 2-	5
63	GND	Electrical Ground	1
64	TX LANE3+	Module XAUI Input Lane 3+	5
65	TX LANE3	Module XAUI Input Lane 3	5
66	GND	Electrical Ground	1
67	RESERVED	Reserved	
68	RESERVED	Reserved	
69	GND	Electrical Ground	1
70	GND	Electrical Ground	1

Notes:

1. Ground connections are common for TX and RX.
2. All connector contacts are rated at 0.5A nominal.
3. 1.2V CMOS compatible.
4. MDIO and MDC timing must comply with IEEE802.3ae, Clause 45.3.
5. XAUI output characteristics should comply with IEEE802.3ae Clause 47.
6. Transceivers will be MSA compliant when no signals are present on the vendor specific pins.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage+5V	Vcc5		6.0	V
Storage Supply Voltage_3.3V	Vcc3		4	V
Supply Voltage APS	Vaps		1.5	V
Storage Temperature	Tst	-20	85	°C
Optical Input Received Power	PIN		-1	dBm

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Case temperature	Tca	0		70	°C
Supply Voltage+5V	Vcc5	4.75	5	5.25	V
Supply Current+5V	Icc5			80	mA
Supply Voltage_3.3V	VCC3	3.14	3.3	3.47	V
Supply Current+3.3V	Icc3			400	mA
Supply Voltage APS	Vaps	1.14	1.2	1.25	V
Supply Current APS	Iaps			700	mA
Module Power Dissipation	Pm			4	W

Electrical Characteristics

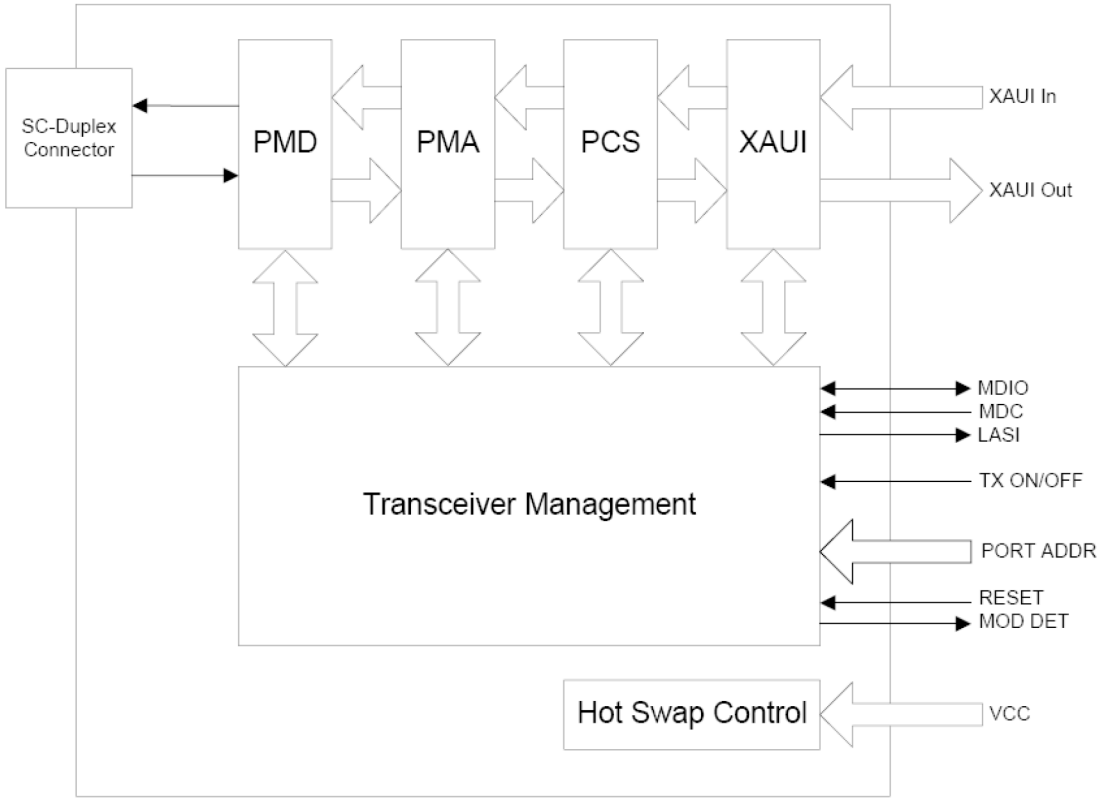
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Data Rate (TXLINE0-3)	TX-xaui		3125		Mbps	
Differential impedance	Zo	80	100	120	Ω	
Differential Input Amplitude	Vin P-P	800		2000	mVpp	
Input Rise/Fall	TR / TF	60		130	Ps	
Differential Impedance of Zin	Zin		100		ohm	
Receiver						
Data Rate (TXLINE0-3)	RX-xaui		3125		Mbps	
Supply Voltage	Zo	3.13	3.3	3.47	Ω	
Differential Output Amplitude	Vin P-P	800		1600	mVpp	
Input Rise/Fall	TR / TF	50		90	Ps	
Differential Impedance of Zout	Zout		100		ohm	

Optical Characteristics

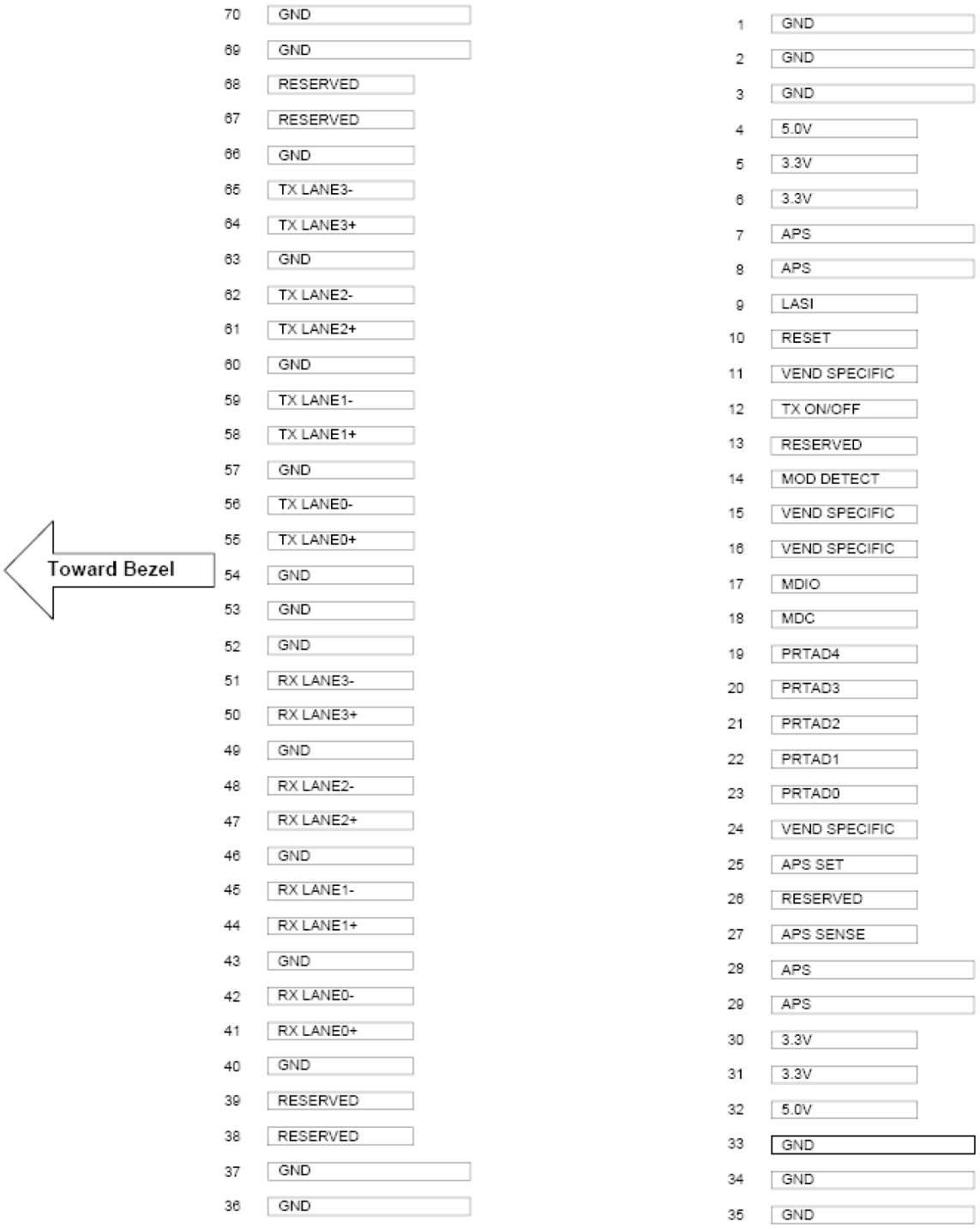
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ	1528	1550	1565	nm	
Optical Transmit Power	Po	-1		2	dBm	
Optical Transmit Power (disabled)	Ptx-dis			-40	dBm	
Extinction Ratio	ER	8.2			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Eye Mask	IEEE 802.3ae Compliant					
Receiver						
Input Operating Wavelength	λ	1260		1600	nm	
Average receive power	Pavg	-15.8		-1.0	dBm	
Receiver sensitivity in 10.3Gbps(OMA)	Rsen1			-14.1	dBm	
Stressed receiver sensitivity in 10.3Gbps(OMA)	Rsen2			-11.3	dBm	
Reflectance	Rrx			-26	db	
LOS Asserted	Lsa	-28			dBm	
LOS De-Asserted	Lda			-19	dBm	
LOS Hysteresis	Lh	0.5			dBm	

Signal Specification- Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
1.2 V CMOS						
Input High Voltage	VIL(MAX)	120	600	850	V	
Input Low Voltage	VIH(MIN)	90	100	110	V	
Capacitance		2.0		Vcc+0.3	pF	
Pull Up Resistance	Rpull	4.7k	10k-	22k	ohm	
MDIO I/O						
Output Low Voltage	VOL	-0.3		0.2	V	
Output Low Current	IOL			4	mA	
Input High Voltage	VIH	0.84		1.5	V	
Input Low Voltage	VIL	-0.3		0.36	V	
Pull-up Supply Voltage	VPULL	1.14	1.2	1.26		
Input Capacitance	CIN			10	Pf	
Load Capacitance	CLOD			470	Pf	
External Pull-up Resistance	EPULL	200			Ohm	

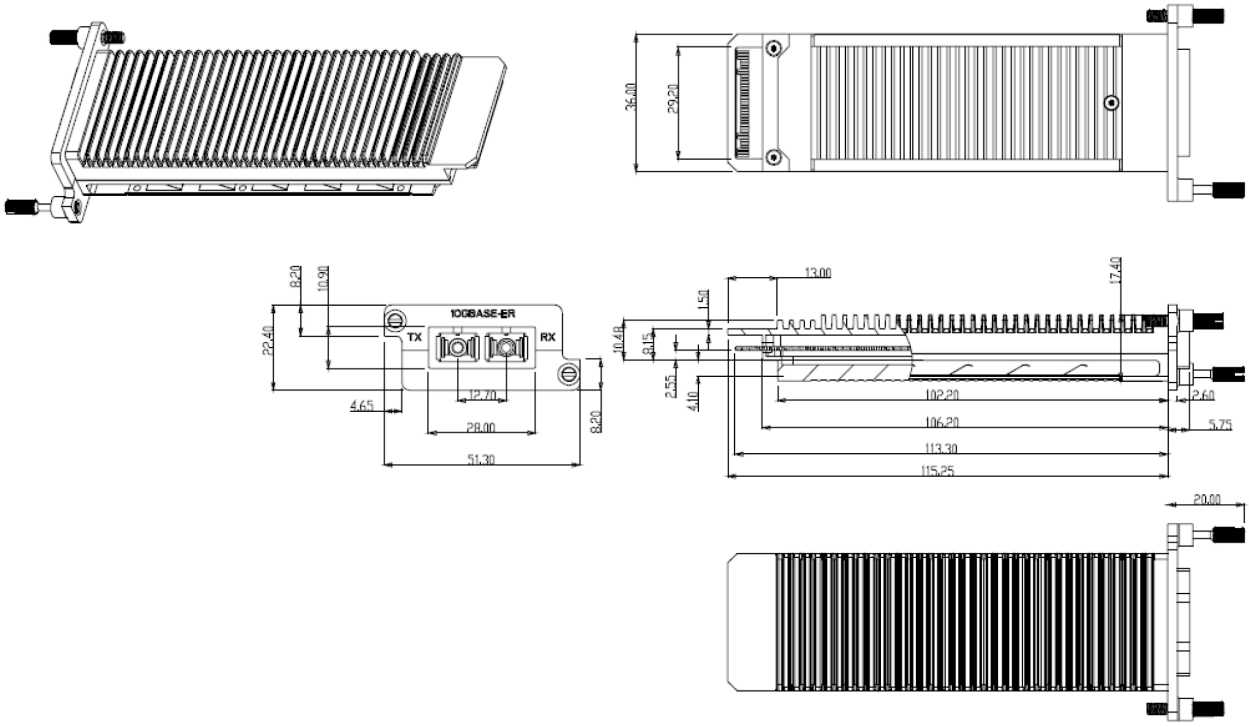


Functional Diagram of Typical XENPAK Style Transceiver



Electrical Pin-out Details

Mechanical Dimensions



Regulatory Compliance

XENPAK Transponder is designed to be Class I Laser safety compliant and is certified per the following standards:

Parameter	Range	Accuracy	Calibration
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No. 50	1120291-000
Product Safety	UL	UL and CUL EN60950-2:2007	WT10093765-D-E-E
Environmental Protection	SGS	RoHS Directive 2002/95/EC	GZ1001008706/CHEM
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003 -	WT10093768-D-E-E

Contact Information

AddOn Computer, Inc. is a leading supplier of Memory Upgrade, Network Transceivers and Network connectivity products to Channel Partners, Resellers and OEMs, with more than seventeen years of direct industry experience. AddOn Computer has been the exclusive supplier to Ingram Micro's "Memory Upgrades" program for the past nine years.

AddOn Computer maximizes profitable opportunities for our partners. Our ability to source product worldwide, ensures that our pricing will always be competitive. Offering turnkey solutions, AddOn Computer has forged a reputation as a solutions provider, delivering high quality, cost effective product in a timely and reliable manner.

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